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July 1, 1965

OBSERVATIONS OF THE SUN, MOON, AND PLANETS SIX-INCH TRANSIT CIRCLE RESULTS

by

A. N. Adams and D. K. Scott

This *Circular* contains positions of the sun, moon, and planets observed with the Six-Inch Transit Circle between 7 July, 1964 and 24 December, 1964. These results are provisional. Definitive results will be published later in a volume of *Publications of the U. S. Naval Observatory*.

These results are a continuation of those published in *U. S. Naval Observatory Circular* No. 105.

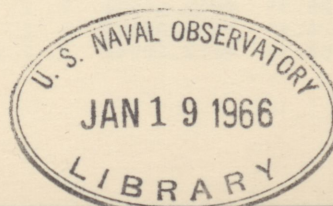
The observed positions are geocentric and have received the usual corrections for instrumental errors, refraction, diurnal aberration, parallax, and orbital motion. The right ascensions were reduced, differentially, to the FK4 system by means of the FK4 stars used to determine the clock correction.

The declinations of the night objects have been reduced to the FK4 system by applying a correction derived from the same stars that were used for the clock correction.

The sun, Mercury, and Venus were reduced with the clock correction of the nearest night tour and the nadirs taken at the time of the observation. Corrections for day minus night differences are not available at this time.

Observations of Mercury and Venus were made on the illuminated limb or on the center of light as indicated, and reduced with the appropriate corrections to the center of the planet. Observations of the sun, Mars, Jupiter, and Saturn were made on both pairs of limbs; those of Mars and Jupiter have been corrected for defective illumination.

The tabular semidiameters from the ephemeris have been used whenever a correction from limb to center or a correction for defective illumination has been applied. The moon observations were made on the illuminated limbs as



SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS

indicated and have been reduced with the tabular values of the semidiameter corrected for irradiation (*Pub. U. S. Naval Observatory*, XVI, 378) and with limb corrections from the charts of C. B. Watts (*Astro. Papers*, Vol. 17).

The computed positions with which the observed positions are compared were derived from the tabular values of the *American Ephemeris* for the instant when the ephemeris hour angle is zero on the meridian $5^{\text{h}} 8^{\text{m}} 15^{\text{s}}.849$ west longitude. No correction has been made for the difference between Ephemeris and Universal Time. The Julian Ephemeris Dates refer to the computed times of transit. The distances, in astronomical units, are those interpolated from the *American Ephemeris* at the computed time of transit. Brown's lunation numbers have been indicated for the moon.

The observers are identified as follows:

- 1, F. S. Gauss; 2, W. T. Toland; 3, S. M. Bestul; 4, B. L. Klock; 5, A. N. Adams;
- 6, D. K. Scott; 7, R. W. Milkey; 8, R. W. Rhynsbarger; 9, G. E. Pease.

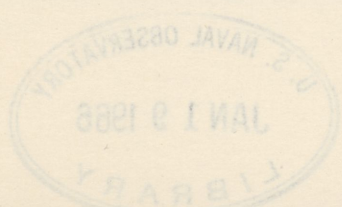
The values of ΔT from the moon observations (lunation means) are listed in Table I. The mean value of ΔT for 1964 is $33^{\text{s}}.67 (\pm 0^{\text{s}}.09)$.

ΔT is computed by dividing (O-C) by 1.002738 times the variation per hour of longitude. The weights in right ascension are proportional to the square of $15 \cos \delta$ times the variation in right ascension per hour of longitude; those in declination are proportional to the square of the variation in declination per hour of longitude.

In order to convert from the equinox of FK4 to that of Newcomb, it is necessary to add $+1^{\text{s}}.34$ to the values of ΔT tabulated in this circular.

TABLE I

Lun.	ΔT s	P.E. s	Lun.	ΔT s	P.E. s
514	31.86	0.70	517	34.14	0.20
515	33.02	0.27	518	33.97	0.33
516	33.84	0.14	519	34.01	0.25



SUN

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s		° ' "	"	
64 07 07.71	8584.21744	2	7 07 38.021	+0.044	+22 32			1.016736
64 07 09.71	8586.21765	4	7 15 49.654	+0.073	+22 17 58.68	-0.69		1.016697
64 07 11.71	8588.21784	6	7 23 59.639	+0.150	+22 02 26.34	+0.24		1.016632
64 07 15.71	8592.21817	4	7 40 13.659	+0.132	+21 26 47.89	-0.78		1.016432
64 07 16.71	8593.21823	1	7 44 15.793	+0.051	+21 16 58.57	-0.47		1.016370
64 07 17.71	8594.21829	9	7 48 17.491	+0.063	+21 06 46.51	-1.25		1.016302
64 07 23.71	8600.21851	4	8 12 15.778	+0.091	+19 58			1.015811
64 07 29.71	8606.21848	1	8 35 53.002	+0.142	+18 37 51.77	-0.95		1.015198
64 08 05.71	8613.21815	9	9 02 59.430	-0.031	+16 50 09.74	-0.66		1.014306
64 08 06.71	8614.21807	2	9 06 49.560	+0.069	+16 33 38.05	-1.29		1.014159
64 08 14.71	8622.21722	9	9 37 08.599	+0.052	+14 12 19.14	-0.99		1.012787
64 08 15.71	8623.21709	8	9 40 53.364	+0.006	+13 53 35.49	-0.64		1.012596
64 08 16.71	8624.21695	6	9 44 37.672	+0.043	+13 34 38.82	-0.14		1.012400
64 08 19.71	8627.21648	1	9 55 47.335	+0.036	+12 36 31.05	-0.72		1.011796
64 08 20.71	8628.21632	6	9 59 29.549	+0.038	+12 16 44.18	-1.00		1.011590
64 08 24.71	8632.21560	8	10 14 13.787	+0.043	+10 55 45.27	-0.74		1.010742
64 08 27.71	8635.21502	1	10 25 12.633	+0.083	+ 9 53 10.91	-0.77		1.010085
64 09 01.71	8640.21396	2	10 43 23.741	+0.014	+ 8 05 48.44	-0.10		1.008946
64 09 02.71	8641.21374	1	10 47 01.221	+0.137	+ 7 43			1.008708
64 09 03.71	8642.21351	8	10 50 38.194	+0.008	+ 7 21 52.85	-0.71		1.008467
64 09 04.71	8643.21329	2	10 54 15.022	-0.015	+ 6 59 43.59	-1.47		1.008222
64 09 05.71	8644.21306	6	10 57 51.719	+0.068	+ 6 37 28.30	-1.39		1.007974
64 09 07.71	8646.21259	8	11 05 04.310	+0.072	+ 5 52 40.26	+0.69		1.007465
64 09 16.71	8655.21040	6	11 37 23.591	+0.033	+ 2 26 42.73	-0.64		1.005033
64 09 17.71	8656.21015	2	11 40 58.749	+0.089	+ 2 03 30.62	-1.35		1.004754
64 09 25.70	8664.20819	9	12 09 41.575	+0.079	- 1 03 02.67	-1.28		1.002518
64 09 26.70	8665.20796	6	12 13 17.592	+0.121	- 1 26 24.14	-0.49		1.002240
64 10 08.70	8677.20536	9	12 56 51.493	+0.072	- 6 04 41.01	+0.03		0.998833
64 10 09.70	8678.20517	2	13 00 31.744	+0.100	- 6 27 31.04	-0.65		0.998541
64 10 10.70	8679.20499	6	13 04 12.425	+0.104	- 6 50			0.998249
64 10 12.70	8681.20464	1	13 11 35.052	-0.016	- 7 35 25.30	+0.51		0.997665
64 10 13.70	8682.20447	6	13 15 17.261	+0.072	- 7 57 51.40	+0.67		0.997373
64 10 14.70	8683.20431	1	13 19 00.009	+0.180	- 8 20 12.87	-1.27		0.997083
64 10 21.70	8690.20337	2	13 45 14.324	+0.055	-10 52 47.63	+0.09		0.995092
64 10 22.70	8691.20327	8	13 49 01.766	+0.048	-11 14 00.27	-0.45		0.994819
64 10 24.70	8693.20308	6	13 56 38.812	+0.088	-11 55 53.19	+0.13		0.994279
64 10 26.70	8695.20293	1	14 04 18.687	+0.040	-12 37 04.23	-0.51		0.993750
64 10 27.70	8696.20287	2	14 08 09.799	+0.064	-12 57			0.993488
64 10 30.70	8699.20273	6	14 19 47.743	+0.080	-13 57 01.35	+0.67		0.992716
64 10 31.70	8700.20270	6	14 23 41.957	+0.066	-14 16 30.12	-0.53		0.992461
64 11 02.70	8702.20268	4	14 31 32.907	+0.129	-14 54 42.62	+0.65		0.991956
64 11 04.70	8704.20269	1	14 39 27.074	+0.121	-15 31			0.991454
64 11 05.70	8705.20271	2	14 43 25.388	+0.108	-15 50 14.47	-0.46		0.991206
64 11 07.70	8707.20278	6	14 51 24.546	+0.113	-16 25 56.53	-0.18		0.990712
64 11 09.70	8709.20289	9	14 59 27.015	+0.089	-17 00 31.94	+0.28		0.990226
64 11 10.70	8710.20296	6	15 03 29.533	+0.110	-17 17 25.07	-0.90		0.989986
64 11 12.70	8712.20312	6	15 11 37.035	+0.114	-17 50 13.68	+0.41		0.989515
64 11 14.70	8714.20333	6	15 19 47.900	+0.151	-18 21			0.989056
64 11 17.70	8717.20371	1	15 32 10.244	+0.044	-19 06 44.57	+0.58		0.988397
64 11 18.70	8718.20385	6	15 36 19.440	+0.099	-19 21			0.988186
64 11 21.70	8721.20435	6	15 48 51.815	+0.114	-20 01 50.29	+0.01		0.987587
64 11 23.70	8723.20472	9	15 57 17.448	+0.105	-20 27 11.13	+1.54		0.987212
64 11 24.70	8724.20492	6	16 01 31.488	+0.134	-20 39 18.98	+1.18		0.987031
64 11 27.70	8727.20558	2	16 14 18.199	+0.185	-21 13			0.986516
64 12 01.70	8731.20657	1	16 31 30.524	+0.121	-21 53			0.985881

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SUN

Date	J.E.D.	O	L	Obs. R.A.	(O-C)	L	Obs. Decl.	(O-C)	Distance
	243			h m s	s		° ' "	"	
64 12 07.70	8737.20828	4		16 57			-22 40 09.60	+2.20	0.985024
64 12 14.71	8744.21052	9		17 28 27.539	+1.03		-23 14 44.89	+1.05	0.984196
64 12 15.71	8745.21085	1		17 32 53.002	+0.68		-23 17 51.23	+0.64	0.984097
64 12 16.71	8746.21119	6		17 37 18.751	+0.79		-23 20 27.63	+2.11	0.984005
64 12 19.71	8749.21221	6		17 50 37.072	+1.45		-23 25 33.79	+1.23	0.983764

MERCURY

64 07 11.76	8588.26481	6	C	8 31 48.446	-0.53	C +20 42 07.63	-0.54	1.235167
64 09 17.66	8656.16479	2	C	10 35 29.023	+0.49	C + 9 26 02.88	-0.90	0.921276
64 09 25.67	8664.17110	9	C	11 16 08.391	+1.51	C + 6 35 18.41	-0.53	1.139292
64 09 26.67	8665.17263	6	C	11 22 17.433	+1.16	C + 6 00 29.24	-1.22	1.163420
64 10 09.69	8678.19518	2	C	12 46 05.580	+1.10	- 3 21		1.375250
64 10 21.71	8690.21422	2		14 00		C -12 02 43.48	-1.31	1.432309
64 10 22.71	8691.21573	8	C	14 07 01.115	-0.23	C -12 42 28.54	-1.33	1.432671
64 10 24.71	8693.21874	6	C	14 19 15.235	+0.11	C -13 59 47.99	+0.53	1.431640
64 10 26.72	8695.22175	1		14 31		C -15 14 10.24	-1.28	1.428342
64 10 30.72	8699.22778	6	C	14 55 57.962	+1.06	C -17 33 06.90	-0.66	1.415183
64 10 31.72	8700.22930	6	C	15 02 06.217	+1.90	C -18 05 42.25	-0.63	1.410552
64 11 07.74	8707.24011	6	C	15 45 18.898	+1.32	C -21 27 23.42	+0.26	1.363215
64 11 12.74	8712.24800	6		16 16		C -23 20 13.42	+0.05	1.313024
64 11 14.75	8714.25115	6	C	16 28 50.636	+1.32	C -23 57 17.73	-0.55	1.288937
64 11 17.75	8717.25580	1	C	16 47 23.152	+1.41	-24 43		1.248310
64 11 21.76	8721.26165	6	C	17 11 36.797	+1.65	C -25 27 05.30	+0.57	1.185401
64 11 23.76	8723.26431	9	C	17 23 19.697	+1.37	C -25 40 35.48	+1.81	1.150081
64 11 27.76	8727.26862	2		17 45		C -25 50 37.08	+1.96	1.071691
64 12 01.77	8731.27069	1	C	18 04 05.147	+0.67	-25 37		0.983793

VENUS

64 07 07.64	8584.14340	2	2	5 20 43.610	-1.77	N +18 20 49.88	-0.36	0.334956
64 07 10.63	8587.13444	2	2	5 19 37.117	-1.09	+18 06		0.349907
64 07 11.63	8588.13168	6	2	5 19 34.369	+0.51	N +18 02 36.81	-0.44	0.355230
64 07 15.62	8592.12169	4	2	5 20 55.051	+0.11	N +17 54 18.68	+0.31	0.378011
64 07 16.61	8593.11945	1	2	5 21 37.305	-0.85	N +17 53 36.36	+0.11	0.384044
64 07 17.61	8594.11730	9	2	5 22 28.244	+0.43	N +17 53 25.13	+1.30	0.390195
64 07 27.60	8604.10069	8	2	5 37 54.405	-0.12	N +18 11 58.17	-0.68	0.457052
64 07 29.59	8606.09829	1	2	5 42 19.773	+0.68	+18 18		0.471319
64 07 31.59	8608.09616	7	2	5 47 07.883	+0.28	N +18 25 39.98	+0.43	0.485799
64 08 04.59	8612.09261	2	2	5 57 46.745	-0.15	N +18 40 08.04	+0.45	0.515287
64 08 06.59	8614.09116	2	2	6 03 34.688	+0.66	N +18 47 08.52	+0.03	0.530246
64 08 07.59	8615.09051	1	2	6 06 35.095	+0.31	+18 50		0.537768
64 08 12.58	8620.08796	7	2	6 22 36.356	+0.73	N +19 05 08.31	+0.53	0.575744
64 08 13.58	8621.08757	8	2	6 25 59.509	+1.24	N +19 07 28.91	+0.69	0.583399
64 08 14.58	8622.08722	9	2	6 29 25.956	+1.25	N +19 09 35.68	+1.22	0.591070
64 08 15.58	8623.08691	8	2	6 32 55.561	+0.66	N +19 11 26.01	+0.46	0.598757
64 08 16.58	8624.08664	6	2	6 36 28.369	+1.03	S +19 13 00.32	-0.11	0.606457
64 08 20.58	8628.08587	6	2	6 51 08.371	+1.12	C +19 16 20.34	-0.16	0.637363
64 08 24.58	8632.08559	8	2	7 06 29.836	+1.59	S +19 14 12.58	-1.21	0.668374
64 08 26.58	8634.08560	9	2	7 14 24.142	+1.27	S +19 10 52.82	-0.70	0.683891
64 09 02.58	8641.08634	1	2	7 43 03.621	+1.50	S +18 45 53.92	-0.12	0.738095
64 09 03.58	8642.08651	8	2	7 47 15.574	+1.25	S +18 40 31.49	-1.18	0.745809
64 09 04.58	8643.08671	2	2	7 51 28.792	+0.37	S +18 34 42.98	-0.56	0.753513
64 09 05.58	8644.08691	6	2	7 55 43.377	+0.76	S +18 28 27.12	+0.85	0.761208
64 09 07.58	8646.08737	8	2	8 04 16.009	+1.88	S +18 14 25.49	-1.29	0.776561
64 09 16.58	8655.08992	6	2	8 43 25.860	+0.93	S +16 47 45.26	+0.12	0.845027
64 09 17.59	8656.09024	2	2	8 47 50.262	+1.36	S +16 35 42.48	-0.57	0.852563
64 09 25.59	8664.09296	9	2	9 23 18.632	+1.77	S +14 42 29.20	-1.25	0.912244
64 09 26.59	8665.09332	6	2	9 27 45.779	+1.39	S +14 26 17.19	-0.35	0.919618
64 10 08.59	8677.09760	9	2	10 21 15.222	+1.63	S +10 39 01.31	-1.30	1.006285

VENUS

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	243			h	m	s		°	'	"	
64 10 09.59	8678.09795	2		10	25		S	+10 17	36.40	-0.41	1.013345
64 10 10.59	8679.09830	6	2	10	30	09.355	+	+ 9 55	49.88	-0.45	1.020379
64 10 15.60	8684.10004	8	2	10	52	22.884	+	+ 8 02	06.41	-1.06	1.055164
64 10 21.60	8690.10210	2	2	11	19	00.500	+	+ 5 36	15.92	-0.79	1.096035
64 10 22.60	8691.10244	8	2	11	23	26.708	+	+ 5 11	04.81	-1.87	1.102751
64 10 23.60	8692.10279	2	2	11	27	52.863	+	+ 4 45	43.07	-0.51	1.109439
64 10 24.60	8693.10313	6	2	11	32	19.163	+	+ 4 20	07.54	-0.41	1.116098
64 10 26.60	8695.10382	1	2	11	41	11.911	+	+ 3 28	20.44	-1.58	1.129326
64 10 27.60	8696.10416	2	2	11	45	38.398	+	+ 3 02	12.07	-0.85	1.135894
64 10 31.60	8700.10556	6	2	12	03	25.618	+	+ 1 16	05.63	-0.19	1.161851
64 11 02.60	8702.10627	4	2	12	12	20.226	+	+ 0 22	16.58	-0.99	1.174636
64 11 05.60	8705.10735	2	2	12	25	43.933	+	- 0 59	04.26	+0.36	1.193565
64 11 07.60	8707.10810	6	2	12	34	41.403	+	- 1 53	37.59	-0.15	1.206018
64 11 10.60	8710.10924	6	2	12	48	10.307	+	- 3 15	39.61	-0.35	1.224452
64 11 12.61	8712.11003	6	2	12	57	11.824	+	- 4 10	19.96	+0.22	1.236577
64 11 14.61	8714.11084	6	2	13	06	15.394	+	- 5 04	55.28	-1.36	1.248572
64 11 17.61	8717.11212	1	2	13	19	55.093	+	- 6 26	19.65	-1.32	1.266317
64 11 18.61	8718.11255	6	2	13	24	29.676	+	- 6 53	16.81	-0.33	1.272167
64 11 21.61	8721.11392	6	2	13	38	17.939	+	- 8 13	32.38	-1.65	1.289518
64 11 23.61	8723.11488	9	2	13	47	33.944	+	- 9 06	20.38	-1.26	1.300915
64 11 24.61	8724.11537	6	2	13	52	13.225	+	- 9 32	28.78	-0.12	1.306562
64 11 27.61	8727.11692	2	2	14	06	16.590	+	-10 49	47.71	+1.29	1.323289
64 12 01.61	8731.11913	1	2	14	25	14.726	+	-12 29			1.345079
64 12 07.62	8737.12282	4	2	14	54	13.594	+	-14 51	12.38	-0.21	1.376657
64 12 08.62	8738.12348	1	2	14	59	07.395	+	-15 13	36.38	+0.03	1.381791
64 12 14.62	8744.12772	9	2	15	28	54.182	+	-17 19	50.44	-2.00	1.411836
64 12 15.62	8745.12847	1	2	15	33	56.025	+	-17 39	22.30	-1.30	1.416718
64 12 16.62	8746.12924	6	2	15	38	59.118	+	-17 58	24.59	+1.31	1.421566
64 12 19.63	8749.13163	6	2	15	54	15.559	+	-18 52	48.29	-0.14	1.435898

JUPITER

64 10 06.32	8674.82054	1		3	33	18.673	+	+17 54	47.42	-0.23	4.206147
64 10 08.31	8676.81467	6		3	32	42.947	-	+17 52	31.93	+0.10	4.186433
64 10 09.31	8677.81172	5		3	32	24.020	-	+17 51	20.86	+0.57	4.176908
64 10 11.30	8679.80580	6		3	31	44.023	-	+17 48	49.18	-0.93	4.158540
64 10 12.30	8680.80282	2		3	31	23.021	-	+17 47	31.51	-0.03	4.149707
64 10 13.29	8681.79984	1		3	31	01.400	+	+17 46	11.13	+0.41	4.141112
64 10 15.29	8683.79386	1		3	30	16.147	+	+17 43	22.85	+0.42	4.124653
64 10 19.28	8687.78181	2		3	28	38.179	+	+17 37	21.41	+0.89	4.094752
64 10 21.27	8689.77574	9		3	27	45.787	-	+17 34	07.86	+0.27	4.081362
64 10 24.26	8692.76660	2		3	26	23.377	-	+17 29	05.27	+0.77	4.063297
64 10 25.26	8693.76354	6		3	25	54.952	-	+17 27	20.01	-0.06	4.057826
64 10 26.26	8694.76048	2		3	25	26.032	-	+17 25	33.93	-0.10	4.052635
64 10 27.25	8695.75741	1		3	24	56.747	-	+17 23	46.59	+0.16	4.047727
64 10 28.25	8696.75434	6		3	24	27.047	.	+17 21	57.59	+0.26	4.043106
64 11 01.24	8700.74200	6		3	22	24.488	+	+17 14	26.82	-0.44	4.027542
64 11 02.23	8701.73891	2		3	21	53.027	-	+17 12	31.15	-0.53	4.024394
64 11 03.23	8702.73581	4		3	21	21.294	-	+17 10	35.18	+0.12	4.021547
64 11 04.23	8703.73271	6		3	20	49.331	-	+17 08	37.47	-0.04	4.019004
64 11 05.22	8704.72961	1		3	20	17.154	-	+17 06	39.03	-0.07	4.016766
64 11 06.22	8705.72650	2		3	19	44.812	+	+17 04	39.84	-0.10	4.014834
64 11 07.22	8706.72340	4		3	19	12.254	-	+17 02	40.35	+0.22	4.013210
64 11 08.22	8707.72029	6		3	18	39.602	+	+17 00	40.08	+0.32	4.011895
64 11 09.21	8708.71718	2		3	18	06.791	-	+16 58	38.59	-0.34	4.010889
64 11 10.21	8709.71407	9		3	17	33.891	-	+16 56	37.96	+0.21	4.010194
64 11 14.20	8713.70163	9		3	15	21.953	-	+16 48			4.010521

6 SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS

JUPITER

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	243			h	m	s		°	'	"	
64 11 15.19	8714.69852	6		3	14	48.996		+16	46	29.67	4.011380
64 11 21.17	8720.67988	1		3	11	33.523		+16	34		4.023024
64 11 23.17	8722.67368	2		3	10	29.754		+16	30	32.25	4.029360
64 11 24.17	8723.67059	4		3	09	58.219		+16	28	36.43	4.032986
64 11 28.15	8727.65824	9		3	07	55.108		+16	21	03.98	4.050505
64 12 08.12	8737.62772	4		3	03	16.307		+16	04	08.14	4.114786
64 12 10.12	8739.62169	8		3	02	26.883		+16	01	10.73	4.130982
64 12 13.11	8742.61269	6		3	01	17.229		+15	57		4.157234
64 12 15.10	8744.60673	9		3	00	34.071		+15	54	34.51	4.175993
64 12 16.10	8745.60377	1		3	00	13.513		+15	53	23.91	4.185738
64 12 17.10	8746.60081	5		2	59	53.569		+15	52		4.195722

SATURN

64 07 12.34	8588.84369	6		22	27	40.645		-11	23	13.72	9.043817
64 07 16.33	8592.83231	4		22	27	00.865		-11	27	52.97	8.998898
64 07 17.32	8593.82946	1		22	26	50.218		-11	29	06.26	8.988212
64 07 18.32	8594.82660	9		22	26	39.194		-11	30	21.86	8.977750
64 07 20.32	8596.82088	2		22	26	16.441		-11	32	56.59	8.957510
64 08 07.26	8614.76885	2		22	22	07.012		-11	59	47.89	8.820147
64 08 09.26	8616.76302	6		22	21	35.299		-12	03	04.81	8.810271
64 08 13.25	8620.75135	7		22	20	30.171		-12	09	44.80	8.793972
64 08 15.24	8622.74550	5		22	19	56.943		-12	13	06.83	8.787571
64 08 18.23	8625.73673	9		22	19	06.483		-12	18	12.02	8.780178
64 08 19.23	8626.73380	7		22	18	49.507		-12	19	53.40	8.778304
64 08 20.23	8627.73088	1		22	18	32.477		-12	21	35.23	8.776728
64 08 22.22	8629.72502	4		22	17	58.302		-12	24	58.91	8.774467
64 08 23.22	8630.72209	6		22	17	41.221		-12	26	41.02	8.773784
64 08 26.21	8633.71331	2		22	16	49.582		-12	31	45.65	8.773520
64 08 28.20	8635.70745	1		22	16	15.143		-12	35	06.10	8.774838
64 09 02.19	8640.69281	2		22	14	49.699		-12	43	20.70	8.783367
64 09 03.18	8641.68988	1		22	14	32.780		-12	44	58.11	8.785970
64 09 04.18	8642.68696	8		22	14	15.859		-12	46	34.46	8.788869
64 09 05.18	8643.68403	2		22	13	59.077		-12	48	09.93	8.792067
64 09 06.18	8644.68111	6		22	13	42.434		-12	49	45.11	8.795561
64 09 07.17	8645.67819	4		22	13	25.808		-12	51	18.36	8.799348
64 09 08.17	8646.67527	8		22	13	09.335		-12	52	51.80	8.803430
64 09 22.13	8660.63457	8		22	09	35.108		-13	12	34.20	8.890279
64 09 25.12	8663.62591	8		22	08	54.387		-13	16	11.50	8.915743
64 09 26.12	8664.62303	1		22	08	41.290		-13	17	21.72	8.924738
64 09 27.12	8665.62015	6		22	08	28.488		-13	18	29.57	8.933983

CERES

64 07 20.11	8596.61966	2		17	35	44.207		-27	22	48.42	1.971093
64 07 21.11	8597.61653	4		17	35	09.329		-27	24	36.39	1.979227
64 07 24.10	8600.60724	8		17	33	33.815		-27	29	43.53	2.004872
64 07 28.09	8604.59509	1		17	31			-27	36	05.62	2.041830
64 07 31.08	8607.58617	4		17	30	44.351		-27	40	31.28	2.071497
64 08 07.06	8614.56600	7		17	29	13.141		-27	50	00.89	2.146619
64 08 15.04	8622.54408	8		17	29	06.525		-27	59	52.74	2.241159

VESTA

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance	
	243			h	m	s		°	'	"		
64 07 10.38	8586.88683	4		23	22	05.428		+0.056	-11 22	22.92	+0.25	1.582592
64 07 12.38	8588.88179	6		23	22	41.733		+0.084	-11 29	08.49	+0.52	1.564722
64 07 17.36	8593.86885	1		23	23	43.074		+0.059	-11 49	27.26	+0.01	1.521995
64 07 18.36	8594.86620	9		23	23	50.254		+0.070	-11 54	05.07	+0.21	1.513811
64 07 20.36	8596.86085	2		23	23	59.435		+0.081	-12 03	54.90	+0.19	1.497830
64 07 21.35	8597.85814	8		23	24	01.408		+0.079	-12 09	06.11	+0.62	1.490041
64 07 27.34	8603.84147	2		23	23	36.427		+0.071	-12 44	01.00	+0.66	1.446337
64 08 06.31	8613.81206	9		23	20	34.068		+0.035	-13 54	53.76	+0.42	1.386725
64 08 07.30	8614.80901	2		23	20	06.414		+0.050	-14 02	42.17	+0.14	1.381797
64 08 09.30	8616.80285	6		23	19	06.263		+0.102	-14 18	37.15	-0.31	1.372556
64 08 13.29	8620.79033	7		23	16	47.195		+0.040	-14 51	23.25	+0.42	1.356636
64 08 15.28	8622.78356	9		23	15	29.082		+0.060	-15 08	07.26	+0.07	1.350005
64 08 18.27	8625.77431	9		23	13	22.140		+0.067	-15 33	24.67	+0.56	1.341781
64 08 19.27	8626.77106	7		23	12	37.414		+0.070	-15 41	51.86	+0.40	1.339507
64 08 20.26	8627.76780	1		23	11	51.559		+0.048	-15 50	18.48	+0.35	1.337473
64 08 22.26	8629.76125	4		23	10	16.792		+0.071	-16 07	07.17	+0.87	1.334124
64 08 23.25	8630.75795	6		23	09	27.910		+0.026	-16 15	29.38	+0.17	1.332814
64 08 26.24	8633.74801	2		23	06	56.358		+0.029	-16 40	14.31	+0.21	1.330360
64 08 28.24	8635.74134	1		23	05	11.830		+0.089	-16 56	22.03	+0.30	1.329971
64 09 02.22	8640.72458	2		23	00	42.093		+0.094	-17 34	49.20	+0.57	1.333430
64 09 03.22	8641.72122	1		22	59	47.356		+0.125	-17 42	06.50	+1.13	1.334890
64 09 04.21	8642.71785	8		22	58	52.393		+0.031	-17 49	15.57	+0.84	1.336606
64 09 05.21	8643.71449	2		22	57	57.558		+0.077	-17 56	15.09	+0.34	1.338578
64 09 06.21	8644.71112	6		22	57	02.736		+0.065	-18 03	03.83	+0.41	1.340808
64 09 07.20	8645.70776	4		22	56	08.111		+0.088	-18 09	42.74	-0.21	1.343292
64 09 08.20	8646.70440	8		22	55	13.701		+0.101	-18 16	08.72	+0.95	1.346033
64 09 17.17	8655.67445	6		22	47	27.265		+0.064	-19 04	53.83	+0.22	1.381906
64 09 22.15	8660.65815	8		22	43	38.218		+0.073	-19 23	59.77	+0.59	1.410178
64 09 25.14	8663.64854	8		22	41	34.946		+0.050	-19 32	34.38	+0.60	1.429826
64 09 26.14	8664.64536	1		22	40	56.499		+0.039	-19 34	57.39	+0.08	1.436806
64 09 27.14	8665.64221	6		22	40	19.482		+0.071	-19 37	05.42	-0.05	1.443997
64 10 06.11	8674.61457	9		22	35	54.490		+0.038	-19 45	32.00	+0.60	1.517705
64 10 08.10	8676.60864	1		22	35	13.614		+0.067	-19 44			1.536130
64 10 09.10	8677.60570	8		22	34	55.738		+0.082	-19 44	10.69	+0.27	1.545598
64 10 11.09	8679.59989	6		22	34	25.179		+0.085	-19 42	09.32	+0.79	1.565025
64 10 14.09	8682.59132	9		22	33	52.349		+0.059	-19 37	32.94	+0.04	1.595338
64 10 15.08	8683.58850	6		22	33	44.895		+0.067	-19 35	35.20	+0.72	1.605739
64 10 23.06	8691.56668	8		22	33	46.782		+0.009	-19 13	02.06	+1.13	1.693740
64 10 24.06	8692.56404	1		22	33	54.610		+0.041	-19 09	24.99	+0.19	1.705289
64 10 25.06	8693.56142	6		22	34	04.095		+0.108	-19 05	36.57	+0.28	1.716949
64 10 26.05	8694.55882	4		22	34	15.082		+0.056	-19 01	38.48	+0.20	1.728717
64 10 27.05	8695.55623	8		22	34	27.720		+0.045	-18 57	30.64	-0.09	1.740591
64 10 28.05	8696.55367	4		22	34	41.991		+0.084	-18 53	12.16	+0.63	1.752568
64 10 31.04	8699.54608	1		22	35	34.056		+0.058	-18 39	21.64	+1.56	1.789080
64 11 01.04	8700.54358	6		22	35	54.496		+0.051	-18 34	28.38	-0.05	1.801434
64 11 02.04	8701.54111	2		22	36	16.466		+0.061	-18 29	24.05	+0.76	1.813875
64 11 04.03	8703.53620	5		22	37	04.853		+0.062	-18 18	51.15	+0.35	1.839003
64 11 05.03	8704.53378	4		22	37	31.232		+0.044	-18 13	21.49	+0.62	1.851683
64 11 06.03	8705.53137	9		22	37	59.078		+0.051	-18 07	44.10	+0.46	1.864435
64 11 07.02	8706.52898	1		22	38	28.334		+0.054	-18 01	59.03	-0.08	1.877257
64 11 08.02	8707.52660	6		22	38	59.014		+0.068	-17 56	04.52	+0.95	1.890147
64 11 10.02	8709.52189	4		22	40	04.428		+0.051	-17 43	54.28	+1.15	1.916110
64 11 11.01	8710.51956	1		22	40	39.148		+0.064	-17 37	38.43	+0.81	1.929180
64 11 12.01	8711.51725	1		22	41	15.158		+0.034	-17 31	14.15	+1.56	1.942303
64 11 14.01	8713.51266	9		22	42	31.056		+0.059	-17 18	07.05	+0.46	1.968700

VESTA

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	243		h m s	s		° ' "	"	
64 11 15.01	8714.51039	6	22 43 10.870	+0.079	-17 11	21.94	+1.01	1.981969
64 11 18.00	8717.50366	5	22 45 17.430	+0.038	-16 50	30.06	-0.03	2.022021
64 11 20.99	8720.49705	1	22 47 34.371	+0.050	-16 28	39.31	+0.91	2.062395
64 11 21.99	8721.49487	6	22 48 22.203	+0.041	-16 21	11.01	+0.61	2.075915
64 11 23.99	8723.49055	4	22 50 01.059	+0.047	-16 05	56.66	+0.32	2.103034
64 11 27.98	8727.48205	9	22 53 30.901	+0.040	-15 34	20.72	+0.40	2.157537
64 11 30.97	8730.47580	4	22 56 18.384	+0.032	-15 09			2.198573
64 12 01.97	8731.47373	1	22 57 16.101	+0.061	-15 01	21.15	-0.26	2.212269
64 12 07.96	8737.46155	4	23 03 20.297	+0.061	-14 09	24.13	+0.70	2.294462
64 12 09.95	8739.45757	8	23 05 28.143	+0.034	-13 51	30.04	+0.38	2.321810
64 12 14.94	8744.44775	9	23 11 00.720	+0.073	-13 05	32.01	+0.77	2.389916
64 12 16.94	8746.44388	5	23 13 18.551	+0.083	-12 46	42.28	+0.49	2.417013
64 12 18.94	8748.44004	8	23 15 38.927	+0.052	-12 27	37.93	+0.75	2.444008
64 12 22.93	8752.43245	8	23 20 26.987	+0.050	-11 48	48.63	+1.12	2.497654

MOON

Lun.	Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)
		243			h m s	s			° ' "	"	
514	64 07 20.06	8596.56872	2	1	16 22	11.196	1.004	N	-19 17	18.16	-4.72
	64 07 21.10	8597.60135	4	1	17 13	15.423	1.183	N	-21 50	17.90	-2.48
	64 07 27.30	8603.80634	2	2	22 32	54.316	1.160	N	-14 07	19.45	+6.26
	64 07 29.37	8605.87037	4		0 13			N	- 4 13	31.62	+8.00
515	64 08 18.04	8625.54764	8	1	17 46	05.906	1.179	N	-23 02	53.47	-1.62
	64 08 19.08	8626.58203	4	1	18 39	41.578	1.197	S	-23 52	22.41	-2.00
	64 08 20.11	8627.61697	8	1	19 34	05.046	1.274	S	-23 31	11.82	+1.25
	64 08 22.18	8629.68641	4	1	21 22	14.448	1.225	S	-19 16	24.67	+5.03
	64 08 23.21	8630.72013	6	2	22 14	52.512	1.252	S	-15 33	27.35	+5.75
	64 08 26.31	8633.81773	2	2	0 47	37.297	1.148	N	- 0 17	07.64	+8.36
516	64 09 16.02	8654.52791	8	1	19 11	56.327	1.297	S	-24 00	18.08	-0.20
	64 09 17.06	8655.56276	8	1	20 06	11.815	1.243	S	-22 54	56.19	+2.54
	64 09 18.09	8656.59736	4	1	21 00	06.448	1.241	S	-20 39	01.12	+3.83
	64 09 22.23	8660.73064	1	2	0 28	19.114	1.199	S	- 2 20	01.74	+9.20
	64 09 24.29	8662.79816	8	2	2 13	42.395	1.273	N	+ 9 12	09.24	+7.66
	64 09 25.33	8663.83403	4	2	3 09	26.404	1.360	N	+14 28	49.27	+6.95
	64 09 27.41	8665.91182	6	2	5 09	38.956	1.502		+22 11		
517	64 10 12.93	8681.43877	5	1	18 49	40.380	1.325	S	-24 21	56.48	+0.22
	64 10 13.97	8682.47333	9	1	19 43	31.242	1.275	S	-23 46	08.18	+2.28
	64 10 15.00	8683.50768	6	1	20 37	03.487	1.334	S	-21 59	54.69	+2.39
	64 10 19.14	8687.64043	2	1	0 04	31.285	1.175	S	- 5 02	02.89	+7.80
	64 10 21.20	8689.70802	9	2	1 49	59.806	1.300	S	+ 6 46	45.20	+7.82
	64 10 23.28	8691.78229	8	2	3 45	07.596	1.434	N	+17 30	31.57	+6.60
	64 10 24.32	8692.82279	2	2	4 47	32.618	1.498	N	+21 24	19.56	+4.28
	64 10 25.36	8693.86503	6	2	5 52	29.054	1.625	N	+23 47	46.05	+2.31
	64 10 27.44	8695.94984	1	2	8 02	49.562	1.460	S	+23 22	12.32	-2.95
	64 10 28.49	8696.98978	6	2	9 04	26.413	1.396	S	+20 44	29.87	-6.21
518	64 11 10.91	8710.41917	1	1	20 15	42.315	1.262	S	-23 03	22.16	+2.87
	64 11 11.95	8711.45271	1	1	21 08	04.848	1.246	S	-20 38	58.92	+4.29
	64 11 14.01	8713.51770	9	1	22 49	48.057	1.145	S	-12 55	03.02	+6.16
	64 11 15.04	8714.54965	6	1	23 39	52.637	1.140	S	- 7 52	06.03	+6.95
	64 11 16.08	8715.58191	2		0 30			S	- 2 15	49.40	+9.28
	64 11 18.15	8717.65023	5	1	2 16	56.514	1.327	S	+ 9 35	19.55	+8.54
	64 11 22.31	8721.81554	6	2	6 31	24.830	1.696	S	+24 31	46.24	-0.79
	64 11 23.36	8722.85973	2	2	7 39	10.451	1.503	S	+24 05	21.71	-0.55
	64 11 24.40	8723.90194	9	2	8 44	03.241	1.509	S	+21 56	44.23	-5.95
519	64 12 12.99	8742.49242	6	1	0 07	38.376	1.175	S	- 4 54	41.91	+7.57
	64 12 15.05	8744.55694	9	1	1 48	41.295	1.220	S	+ 6 31	41.53	+8.38
	64 12 16.09	8745.59215	1	1	2 43	28.799	1.362	S	+12 12	15.14	+7.75
	64 12 17.13	8746.63039	5	1	3 42	38.053	1.427	S	+17 20	31.12	+5.26
	64 12 19.21	8748.71651	8	2	5 54	52.823	1.712	N	+23 58	36.80	+1.93
	64 12 23.38	8752.88871	8	2	10 19	17.553	1.366	S	+15 43	00.26	-7.03